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JOHN DUER IRVING

JUST at the close of last July, not only personal friends, but geologists in general in America were shocked and grieved to learn of the death of Captain John Duer Irving of the 11th U. S. Engineers, professor of economic geology in the Sheffield Scientific School of Yale University, on leave. Alike as active and productive geologist, as successful and devoted teacher, and as managing editor of the magazine *Economic Geology* from its beginning in 1905, Professor Irving was known and esteemed by a very wide circle. He was born August 18, 1874, in Madison, Wis., where his father Roland Duer Irving was professor of geology in the State University, and was just starting his fruitful investigations in Lake Superior geology. John, the son, lived in Madison until his father's all too early death in 1888. Mrs. Irving removed to the east and John was prepared for Columbia College, which he entered in 1892, representing the fourth generation of his family in the direct line, to be registered on the college rolls. He graduated in 1896 and took his doctor's degree in 1899.

Beginning in the vacation following his junior year, he had field experience each summer, and worked successively in the Uinta Mountains of Utah; the Adirondacks in New York; the San Juan region of Colorado; and in the Black Hills of South Dakota. Partly from the example of his father and partly from the writer's influence, economic geology became the branch which he specially followed. On taking his Ph.D. Dr. Irving joined the U. S. Geological Survey, and was assigned to a party in the Black Hills, and in time under the oversight of S. F. Emmons completed the professional paper on the ore deposits of the northern hills. His association led to his becoming in later years Dr. Emmons' closest associate in the revision of the famous Lead-

ville monograph. The close and confidential relation with Dr. Emmons, who was one of the most careful and accurate of American geologists, as well as one of the best of men, was extremely influential upon the younger man. Irving also had experience while connected with the U. S. Geological Survey in the Globe district of Arizona; at Park City, Utah; in the Needle Mountains and at Lake City, Colorado; and in the coal regions of Indiana and Pennsylvania. In his later years he visited the western states and Alaska on mine examinations and in connection with apex litigation.

His first teaching experience came in 1903, when he substituted for Professor Wilbur C. Knight for a year at the University of Wyoming. He was called to Lehigh University in 1904, and to the Sheffield Scientific School of Yale in 1907. His work as editor began in 1905 when the magazine *Economic Geology* was established and he was the choice of its directors for managing editor.

Professor Irving has left a very creditable series of papers, which were issued during his connection with the U. S. Geological Survey. His work is marked by accuracy and patient care. He was not only a good observer, but possessed abilities of description and inference of a high order. In this group of his contributions the most elaborate will be the revised monograph on Leadville. While the fundamental observations and data were accumulated under Dr. S. F. Emmons' oversight and in no small degree by him personally, Dr. Emmons died when he had only prepared a few pages of introductory manuscript and the main work of composition was completed by Professor Irving and was done with scrupulous and almost filial devotion.

As editor of *Economic Geology* Dr. Irving was tireless and persevering. In large degree his efforts to secure papers brought to its pages the long list of striking and timely contributions with which they are crowded. He obtained thereby a wide and intimate acquaintance with topics of interest. He himself made especially thoughtful and suggestive contributions on the criteria for identifying replacement-deposits; on the causes which localize ore-shoots; and on the importance of having the same observer study large problems in many localities, rather than work out the details and teachings of a single district.

Dr. Irving had a fine sense of clear and finished literary expression, as might justly have been expected of one whose direct forbear was Washington Irving's brother; and whose father's work was marked by the same characteristics. In disposition he was considerate, kindly and affectionate, such that he was greatly endeared to his friends.

When German ambitions and hostility in the spring of 1916 began to threaten the United States with the grim possibility of war, Professor Irving went to the officers' training camp at Plattsburg. Being unmarried he felt it his duty to fit himself for service and at the close of the training period handed in his name as available if needed. In the spring of 1917 he was called and passed his examinations for a captaincy. He was commissioned in the 11th U. S. Engineers, "the fighting Engineers" as they have been known since Cambrai. He sailed for France in July, 1917, and had been building railroads and giving instruction to young officers in mining engineering as long and continuously as he was able. His strength became overtaxed, and when an attack of Spanish grippe developed into pneumonia, he could not resist it. He passed away July 20, in Flanders, and his name was entered on the Roll of Honor.

James F. Kemp

RACE-APPRECIATION IN LATIN AMERICA

Anthropologists, in their elaborate, careful and invaluable researches into the past history of the native race of the American continent, have been wont to devote the major part of their space to the *former* cultural attainments of that race. They ignore the fact that, in Mexico, in some of the Central American countries, in Colombia, and in the Andean countries (Ecuador, Peru and Bolivia), that race is to-day anywhere from sixty-five to eighty-five per cent. of the total population.

Of course the degree of racial purity varies considerably, but this high percentage includes all those who have an obvious and undeniable admixture of indigenous blood. For this reason it is exceedingly important that anthropologists, who are already well informed as to the *past* of these people, should, for the sake of our continent as a whole, set themselves to learn about their *present* status.

A beginning of this necessary study has already been made. In Mexico, the well-known archeologist, Manuel Gamio, is now the head of a branch of the Secretaria de Fomento which has as its purpose the collection of data relating to the present numbers, cultural and economic condition of the Indians, and to the steps that should be taken to insure their highest development, not only on their own account, but for the sake of the benefits that will accrue to the state from such a policy. The work of Gamio's Dirección de estudios arqueológicos y etnográficos has already been sketched by him in a recently published book.[1] It is quite clear to any one who reads this remarkable little book with due care that the fundamental trouble with Mexico is not, as most of us North Americans are wont to think, some inherent wickedness and turbulence on the part of the Mexicans, but that it arises from the maladjustment of Mexico's political institutions to her racial and psychological temperament. It is Gamio's purpose to change this condition so as to make available to Mexico the great store of strength and virtue which lies hidden in the hitherto misunderstood and despised Indian element. To do this drastic reforms in the educational, agrarian and economic institutions of the country will doubtless be necessary. Time and study will reveal just what is needed.

A situation very similar to that in Mexico exists in many other Latin American countries, as I have said. It has been my especial good fortune to study this matter in Peru and Bolivia. Because of my first-hand knowledge of the importance of race-appreciation in those countries I may speak about it fully, for it is an important matter. Before proceeding further, I would better define the term I have used. Race-appreciation is the study of those cultural elements which survive from the formerly independent cultural state of the Indians (or any similarly subjected race) into our own day. It seeks to blend all that is best in them with all that is best in white culture so that the dual population of such countries shall have institutions based upon those of both component races.

The matter of race-appreciation in the Andean countries is of the highest importance for their future development. On the coast the present situation of the Indians is not by any means of the worst. Many of their own social and governmental institutions survive, which makes for contentment on their part and for a firm but kindly control by the whites of the upper class. As elsewhere in the Andes, the land almost all belongs to very large landed estates. The owners of these, for the most part, differ from their Mexican counterparts in not being oppressive and unjust. I have known a great many people of this class in different parts of Peru, and I can say frankly that not only are they progressive and eager to better the conditions of their native tenants but also that the Indians esteem and like them. Nevertheless, a process of reform, especially with regard to sanitary conditions, housing, clothing, pastimes and working-places, would be of inestimable value, especially if it were so conducted as to take over the native administrative system (based on families, clans and tribes) and made use, at the same time, of the special skill of these people in such matters as weaving, irrigating and building.

To reduce the matter to concrete terms I will speak of each one of these three aptitudes in terms of what might be done to make them useful to modern society. In the first place, I will venture to remind the reader that in pre-Columbian times the people of the Peruvian coast made the finest cotton and woollen

[1] Gamio, Manuel, "Forjando Patria," Mexico, 1916. Should any one who reads this article care to have a copy of Mr. Gamio's work (which is in Spanish), I shall be glad to supply him with a copy gratis so long as the very few which I have hold out. My address is given below.

textiles that have ever been made. Not only were they strong and durable, as well as of fine texture, but they were also exquisitely dyed with tasteful designs. Some of them were wonderfully embroidered; still others had striking patterns painted upon them. To-day the cotton raised on the Peruvian coast is rapidly getting to be the best grown anywhere. The supply of llama and alpaca wool might soon be vastly improved if care were devoted to the matter. Furthermore, there is no reason why, after necessary experiments as to methods had been made, the two other great fabric materials of the world (linen and silk) should not be grown in Peru. With plenty of raw material at hand, why could not steps be taken to make use of the weaving ability which to-day is remarkably strong in the coast Indians? Of course, to put such an enterprise on a modern and economically productive basis weaving machinery would have to be used. But that would prove no drawback, as far as the people themselves are concerned. They are very intelligent, and they take quickly to mechanical contrivances, as is proved by the success with which Indians are used in cotton gins, sugar mills and similar places. Perhaps it would be best to work out some variety of loom half-way between their hand-looms and our North American type. This might result in giving greater play to their natural genius for weaving.

In the matter of irrigating the Indians long ago proved themselves adepts. Steps should be taken to encourage them to re-irrigate those parts of the country in which the old irrigating canals were destroyed by the Spaniards. To encourage this, the owners of the land could hold out special rewards to enterprising Indians, such as practical freehold (long lease or a percentage in the profits). The whites have not the aptitude in this direction that the Indians have. White engineers, in their eagerness to plan and build enormous hydraulic works that would cost millions, lose sight entirely of the tremendous amount of work that once was and could again be done in a small way, by building slowly a little at a time. In many cases, the engineering problems involved, especially those which concern the restoration to use of ancient irrigation canals, are not of great difficulty, and more could be done along the piecemeal, bit by bit line than by elaborate dams and prohibitively expensive pumping works.

In the matter of architecture, the ancient pottery of the coast people shows us that the people used to build houses which were not only tasteful and picturesque but were airy and cool as well. They had gabled roofs, made of thick thatch, and thick walls of adobe. There were windows of various odd and quaint shapes, as well as doors. When one compares these admirable structures to the wretched flimsy huts made of cornstalks and old tin cans daubed over with mud which serve the people to-day, he sees how much better was their old condition. If the ancient skill of these people in making fine and durable adobe could be turned to the manufacture of the still better concrete, and if the systematic use of good houses designed after those anciently used could be introduced, the living conditions, health, productiveness and vigor of the people would mount rapidly.

In all these directions, as well as in others which lack of space forbids me to mention, there is imperative need of a judicious adaptation to modern needs of the inherent abilities of the people.

In the highlands, the situation is far less satisfactory. The climate is cold and depressing. There is a general lack of fuel for warming the houses and for warming water for bathing purposes. In addition, there is the necessity of constant and very heavy labor if any but the most meager crops are to raised. Alcoholism is a pronounced evil in the highlands. As a result of all these sadly adverse circumstances, the people are doltish, filthy and depraved, not only the Indians but also some of the whites. It is for the more felicitously situated and enlightened elements of the population to do what they can, especially by rigidly enforcing the laws to curb alcoholism, to ameliorate these conditions. Race-appreciation here, as on the coast, must play an important part, for today almost nothing is

being done to study the Indians and their peculiar abilities in weaving, handicrafts, masonwork, irrigation and other directions for the sake of adapting them to modern requirements. For one thing, I believe that the Andean countries are capable of becoming leaders in the production of cattle and sheep. The present stock, however, requires to be improved by new blood. Then too, the native wool-yielding animals, the llama, alpaca and vicuña, should be studied and taken care of. For all this the highland Indians supply the necessary labor element. If shaken loose from their alcoholism and their resultant depraved ways, and if given decent living conditions, they would rapidly become fine sturdy peasants equal in capacity and intelligence to the peasants of Switzerland. So many travelers and superficial observers who have not lived among these people or who have not observed them with sympathetic eyes have told the world that their condition is hopeless that many people now believe it is so. I am sure, however, that, given proper aid now, the Indian mountaineers could be lifted into the state which I have mentioned.

To conclude I will present several reasons for the necessity of anthropologists' doing what they can to aid in race-appreciation, especially as regards the countries under consideration.

1. The indigenous element, more or less pure, forms so large a part of the entire population that it is positively dangerous not to develop to the utmost all its latent capabilities. If this is not done these countries will find themselves weighed down with an enormous element which is not merely economically underproductive, but which is really vicious and seditious, productive of all manner of social evils, the result of four centuries of bad treatment by white men.

2. If race-appreciation is seriously instituted, the countries where it takes effect will find that their commercial output will increase rapidly on account of the increased mental and physical vitality of the great majority of the people. The population will not only grow fast because of the cutting down of the death-rate, but those who live will work better and will be stronger and happier than their forebears of the days since the Conquest.

3. If steps are taken by the various owners of large landed estates in the Latin American countries under consideration to learn about the Indian or labor element of their tenantry, either from professional anthropologists and ethnologists or from their own observations, and if they will seriously undertake the reforms that may be found necessary, the result may be that salutary one of showing the world that it is possible for distinct classes to work together in harmony and without constant irritation and recriminations.

4. On account of natural conditions involved in the climate and geography of the countries under discussion European immigration on a large scale will never take place. Indeed, there is a general apprehension in those parts that the small supply of mechanics and other specialists who hitherto have come from Europe and North America will, on account of war- and post-war conditions, presently cease to be available. It is obvious, therefore, that if those countries wish to progress according to modern standards they will either have to try the rather perilous experiment of importing large numbers of Orientals and Pacific Islanders, or they will have to take immediate steps toward bringing their present population to as high a level of development as possible. This can only be done in accordance with the principles of race-appreciation. It should be done soon.

Although I have been speaking of America especially, I wish to remark before concluding this brief sketch that race-appreciation may be said to be needed in every country where the white race has imposed its dominion upon some other race with a more or less vigorous cultural character of its own. The British, in India, Burmah and other colonies of theirs have been, half unconsciously, following these principles for decades. That explains their success. The same may be said of the French in Annam, Morocco and Algeria. It is ob-

vious that no other policy than that based upon race-appreciation is either just or stable.

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THE AMERICAN SYSTEM OF AGRICULTURAL EDUCATION AND RESEARCH AND ITS ROLE IN HELPING TO WIN THE WAR[1]

The United States has, in its Federal Department of Agriculture and state (land-grant) colleges of agriculture, a system of agricultural research and education which was established more than 50 years ago and which reaches every part of the country and effectively deals with every phase of agriculture. It is worth noting that the national foundations of these two great agencies for the betterment of agriculture were laid in another period of great national stress.

The act of Congress creating the Federal Department of Agriculture was signed by Abraham Lincoln on May 15, 1862, while the Civil War was in progress. On July 2 of the same year he approved the so-called land-grant, or Morrill, act, giving the proceeds from the sale of certain allotments of the public land to each state and territory for "the endowment, support, and maintenance of at least one college where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts . . . in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life."

The national system of agriculture, education and research thus established has been greatly developed by subsequent legislation, notably the acts providing for agricultural experiment stations in each state and for cooperative extension work in agriculture and home economics. Many other important and highly significant laws for the betterment of rural life have been placed on the statute books within the past few years, including especially the cotton-futures act, the United States grain-standards act, the Federal warehouse act, and the Federal aid road act. All these measures are administered by the Department of Agriculture and they are achieving, in marked degree, the purposes contemplated by their framers. The federal reserve act, the farm-loan act, and the federal vocational education act also constitute an important part of the legislative program for the improvement of rural conditions and the development of agriculture. Thus the nation was well prepared along agricultural lines to deal promptly and effectively with the emergency problems that have arisen since the United States entered the war. It is not extravagant to say that this nation had agencies working for the betterment of rural life and agriculture which, in point of personnel and effectiveness, exceed those of any other three nation in the world combined.

The land-grant colleges and experiment stations are without parallel. They are 67 in number, have a total valuation of endowment, plant, and equipment of $195,000,000; an income of more than $45,000,000, with 5,900 teachers; a resident student body of over 75,000, and a vast number receiving extension instruction. Their great ally, the Department of Agriculture, is unquestionably the greatest practical and scientific agricultural organization in the world. It has a staff of more than 20,000 people, many of them highly trained experts, and a budget of approximately $65,000,000.

The graduate and collegiate instruction and the research work inaugurated by these agencies take rank with the best in the world. As the result, a large corps of leaders and specialists, capable of dealing efficiently not only with the vital question of agricultural production, but also with important war problems not directly connected with agriculture, has been trained. Through the educational work of the colleges a great impulse has been given to vocational training in agriculture and through the research work of the Federal Department and the experiment stations a great

[1] *Weekly News Letter*, Department of Agriculture.

body of new facts of value to agriculture has been accumulated, which the extension service carries directly to the farm and farm home.

The extension, or demonstration, method of teaching and inducing farm people to adopt improved practises is a distinctly American educational development. It was first used in a systematic way in 1903 by the late Dr. Seaman A. Knapp in his efforts to teach southern farmers how to meet the menace of the boll weevil. This method of giving practical instruction in agriculture and home economics to persons not attending or resident in colleges by means of demonstration, that is, by doing on the farm or in the home, or better, by having the farmer, or the housewife, or their children do the thing it is desired to teach, has been developed by the United States Department of Agriculture and the state colleges of agriculture during the past fifteen years. It was made a permanent and nation-wide system and liberally endowed by the cooperative extension act of May 8, 1914, which provided that all such work should be coordinated and carried on cooperatively by the state colleges of agriculture and the Federal Department of Agriculture.

The department exercises administrative and general supervisory control of this work through its States Relations Service. It is administered in each state through a director of extension with headquarters at the state college of agriculture, in accordance with plans agreed upon by the Federal Department and the state colleges. The field work is done by (1) men county agents, (2) women county or home demonstration agents, (3) boys' and girls' clubs, and (4) a corps of specialists furnished by the Department and the state colleges. Through these agencies it reaches at first hand and in a very practical way the men, women and children of each rural community.

The cooperative extension act will ultimately (in 1922–23 and thereafter) provide $4,580,000 annually for this work, to which the states must add $4,100,000 annually in order to share in the benefits of the act. During the fiscal year 1917–18 there was available for extension work from these sources $3,680,000. Funds from other sources increased this amount to $7,600,000. In addition, $4,348,000 of the special appropriation made to the Department of Agriculture last year for the stimulation of agriculture was devoted to the expansion of the extension work as a war-emergency measure.

That the nation entered the war with well-organized and highly efficient agencies working for the betterment of agriculture is well illustrated by the part they have played in dealing with food problems during the present emergency. In April, 1917, the food situation of the nation was not satisfactory. The time for action was short. It was necessary that nothing be omitted to increase the supply of food, feed, live stock and clothing, and to grow strong in agriculture, while Europe, and especially the central powers, was growing weak. The machinery was ready. The farmers and their organizations were alert. The department and its great allies, the land-grant colleges, immediately proceeded to redirect their activities and to put forth all their energies in the most promising directions. In a conference of the agricultural leaders of the nation in St. Louis, called just before the United States entered the war, a program for further organization, legislation and action with reference to production, conservation and marketing was drawn up, the principal features of which have been enacted into law without substantial change or have been put into effect. This prompt and effective handling of the situation was made possible by reason of the fact that the American people, generations before, had wisely laid the foundations of many agricultural institutions and had with increasing liberality supported their agricultural agencies.

In due course the Congress enacted the food-control bill, conceived at this conference, now administered by the Food Administration, and the emergency food-production act, administered by the Department of Agriculture. With funds made available by the latter act, the department increased its activities along all essential lines and developed new ones. It

and the state colleges cooperating with it quickly took steps to expand the extension work, with a view to placing in each rural county one or more agents. Within a year the number of county and home demonstration agents, club leaders and specialists in various lines employed in the great extension system was more than doubled, thus putting into effect within a year a program of expansion which under ordinary conditions would have required many years to complete.

The number of men county agents has been increased from 1,434 to 2,435 within the year, the women home demonstration agents from 537 to 1,715, and similar increases were made in the personnel of the boys' and girls' club work. To-day there are employed in this great educational system over 6,000 county and home demonstration agents, club leaders, and specialists in various lines, and the extension work is organized in substantially every agriculturally important county in the country. These agents are not only aiding the farmers in agricultural problems, but they are also rendering valuable assistance to other branches of the government, such as the Treasury Department, the Food Administration, and the Red Cross, in the prosecution of their war activities.

The efforts and achievements of the millions of farm men and women of America have been noble and remarkable. The farmers have occupied the first-line trenches of the food army. They and the agencies assisting them, the Federal Department, the state colleges, and also the state departments of agriculture, were ready when a state of war was declared and had been for years. They were charged with the responsibility for maintaining and increasing production. How they have discharged their task the results of last year's production operations and of this year eloquently testify.

David F. Houston,
Secretary of Agriculture

SCIENTIFIC EVENTS

TRENCH FEVER AND LICE[1]

In October, 1917, the American Red Cross Society, in conjunction with representatives of the British Expeditionary Force, formed a committee to investigate trench fever. This body has carried out much very valuable work, but its full report has not yet been made.

About the same time a War Office Committee, under the chairmanship of Major-General Sir David Bruce, was formed in England, in order to advance the knowledge of trench fever with a view to its prevention, and the research in progress at Hampstead was merged in that of the committee, of which Major Byam became a member.

Up to the close of the year the work was confined to the study of clinical evidence, the examination of the blood and urine of patients, together with the feeding of lice on them during their febrile periods, followed by the subsequent microscopical examination of the insects with a view to the discovery of the infecting organism.

With the commencement of 1918, thanks to the financial assistance of the Lister Institute and the courageous and patriotic action of a number of volunteers, it became possible to widen the scope of the research, and very valuable results speedily followed. A confirmation was obtained of McNee's main results of direct inoculation from patient to patient by blood, and the problem of transmission by the louse was seriously attacked. The committee was fortunate in having at its disposal ample stocks of lice, free from suspicion of previous infection, which had been reared under the direct supervision of Mr. Bacot, entomologist to the Lister Institute.

The first experiments in which the insect vector was concerned consisted in two of the volunteers submitting themselves to the bites of several hundred lice daily, the insects having been previously fed on patients during febrile periods both before and during the month of experiment. The lice, therefore, had many opportunities of becoming infected, and the men received the bites of these lice three times each day for thirty days. Neither showed any of the symptoms of trench fever.

Next, following the analogies of relapsing and typhus fevers, two volunteers were inoculated from lice which had fed repeatedly on trench-fever patients. In both the inoculation

[1] From *Nature*.

was made by scratching the skin and rubbing in, eleven crushed lice in one case, and excreta voided by the lice in the other. Both men developed typical symptoms of the disease, with a relapse in six to eight days. The inoculation of louse excreta into scratches has been repeated a number of times, and in every case an attack of the disease has resulted.

It was found that the incubation in man, when infected by scarification, was remarkably constant, *i. e.*, six to eight days, and the ease and certainty with which infection could be produced pointed to the inoculation of the contents of crushed lice or louse excreta as in all probability the common, if not the invariable, method of transmission.

The excreta obtained by shaking through the gauze cover of the boxes in which the lice were confined were used in the form of a dry powder, which remained infective for at least sixteen days. In parallel experiments with the excreta of normal lice which had not been fed on trench-fever patients no symptoms of the disease were produced.

That a very small amount of blood, such as might be contained in ten lice, does not directly convey the disease through an excoriation of the skin, is indicated by the negative result obtained by rubbing 5 c.mm. of infective blood into scratches on the skin of a volunteer.

Moreover, the following series of experiments points to the fact that the louse, after a meal of infected blood, does not void infective excreta for some days. Lice were fed on a trench-fever patient on one day only, and then on healthy men. Excreta collected on the first, third, fifth and eighth days after infection gave negative results, while those collected on the twelfth and twenty-third days proved virulent. The virus, therefore, would appear to undergo some preparation in the insect before it becomes infective. Whether this change in the louse is due to a simple multiplication on the part of the hypothetical microorganism, or to a cycle in its development, is as yet undetermined. Further, it was shown that the ingestion of louse excreta did not produce trench fever in two men who daily swallowed a dose for seven and fourteen days, respectively.

GRANITE FOR BUILDING IN 1917

THE total value of granite sold for building stone in 1917 was $2,881,128, a decrease of $1,083,305, or 27 per cent., compared with 1916. The rough stone sold was valued at $590,310, which was $312,736, or 35 per cent. less than in 1916; the dressed or manufactured stone was valued at $2,290,818, which was $770,569, or 25 per cent., less than in 1916. Accurate figures showing quantities are not yet available, but owing to a general increase in price the decrease in percentage of output was considerably more than in value.

The statistics given were compiled under direction of G. F. Loughlin, of the United States Geological Survey, in cooperation with the National Building Granite Quarries' Association and the State Geological Surveys of Georgia, Maryland, Minnesota, Missouri, New Jersey, New York, North Carolina, Pennsylvania, Virginia, Washington and Wisconsin.

Sales of granite for building were reported from 26 states in 1917 compared with 28 in in 1916. Massachusetts, with a total value of $646,506, and Maine, with $525,604, ranked first and second. New Hampshire, second in rank in 1916, was third in 1917, with a value of $337,233. Massachusetts, with $132,700, and Maine, with $109,941, were the only states whose sales of rough granite exceeded $100,000 in 1917, and each of these showed a decrease of about one third compared with 1916. New Hampshire followed with $78,484, a gain of about one quarter. Pennsylvania, which ranked first in sales of rough granite in 1916, with a value of $224,360, was credited with only $87,978 in 1917. The few other states that showed gains had values of less than $15,000.

In sales of dressed granite also Massachusetts, with $513,806, and Maine, with $424,663, were the leading states. Maine, however, has made continuous gains in 1916 (2 per cent.) and 1917 (55 per cent.), whereas Massachusetts in the same years has suffered losses of 17 per cent. and 19 per cent., respectively. North Carolina's output, chiefly stone for mausoleum work, though classed previously as

building stone, has been transferred to monumental stone, the class in which it more properly belongs. New Hampshire, Vermont, California, Georgia, Rhode Island and Minnesota had values in excess of $100,000 in 1917. Of these Georgia made gains in the last two years, its value for 1917 nearly doubling that of 1915, and Rhode Island more than tripled its value for 1916. The other states named showed decreases of 10 to 50 per cent.

The reduced output during the last year was due to a marked increase in the cost of labor, material and freight. The general average increase was probably about 30 per cent., but some items increased much more.

Prices increased, though in most places not in proportion to the increase in costs. Some producers reported an increase of 20 to 30 per cent. One company in Maine reported an increase of 50 per cent., and two companies in New Jersey an increase of 100 per cent. for rough stone. A few companies in New Hampshire, Maryland and the District of Columbia reported no increase in price.

The demand was prevailingly small, owing to a general curtailment in the erection of both government and private buildings in which granite is ordinarily used. This curtailment in turn was caused by a shortage of labor for building, a shortage of other building materials, and the increased price of these materials and of building stone.

As building operations were very active early in 1917, the curtailment in them not becoming marked until about midsummer, the production in 1917 may be considered an average between very good and very poor. The period of severe depression continued through the first six months of 1918, and as there is no prospect of early improvement the production of building stone, as well as of other materials that are used mainly in buildings of the better classes, will probably be considerably less in 1918 than in 1917. The present abnormal period, in which most of the buildings erected are temporary, will probably be followed by a period in which permanent buildings of high architectural merit will be constructed, and this change will be reflected in a rapid recovery of the building granite industry.

THE PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES

The following report from the editorial board of the *Proceedings of the National Academy of Sciences* was presented by the chairman, Raymond Pearl, at the spring meeting of the academy and is now printed in the *Proceedings*.

1. Three volumes of the *Proceedings* have been completed, and four numbers of the fourth volume have been issued.

The statistics as to the make-up of the third volume, both in respect of subject-matter and of source of the contributions, have been printed in the Annual Report of the Academy for 1917, and need not now be repeated except so far as covers one point.

The statistics of articles by members of the academy as compared with articles by non-members are interesting mainly in showing a progressive diminution in the percentage of articles by members, despite the increase in membership of the academy. If there are obstacles which can be removed and which hinder members of the academy from printing in the *Proceedings*, would it not be well to make efforts to remove them? The academy represents the highest point in American research, and if the *Proceedings* should actually contain articles representing the totality of the investigations of members of the academy it would become thereby largely representative of all American research and of very high grade, and furthermore it would be more truly the proceedings of the academy in the sense that corresponding publications of foreign academies are representative of their research.

2. At the autumn meeting the terms of office of five members of the editorial board expired, and new appointments were made by the council as follows: Jacques Loeb, W. M. Wheeler, E. B. Frost, E. L. Thorndike and E. H. Moore.

3. At the autumn meeting the board decided to put into operation certain changes in the typographical make-up of the *Proceedings* in the interest of economy. These changes have been made with satisfactory results.

4. The editorial board is of the opinion that in view of the now established and recognized position of the *Proceedings* as a medium of scientific publication, the members of the academy might well contribute more of their own papers to its pages than they now do, both from the standpoint of self-interest as well as from a sense of duty to the academy and what it stands for. In this con-

nection the board would recommend that the academy adopt as a general principle the policy of requiring each recipient of a grant for research from any of its special funds to publish some account of the results of the researches under the grant in the *Proceedings*.

5. If the above recommendation is adopted, the board would further recommend that the academy suggest to the several committees having in charge trust funds from which grants are made that whenever accounts of researches under grants are published in the *Proceedings* there shall be paid over from the trust funds out of which the grants are made, to the *Proceedings* account, if such action be permissible under the terms of the bequest, a sum of money to cover the expense of the publication at a rate of $6.00 per printed page.

Anent the above report the following recommendations were submitted from the council and adopted.

That the following recommendations from the editorial board of the *Proceedings* be approved by the academy and that the home secretary be instructed to bring these recommendations to the attention of the members of the academy and the chairmen of the trust funds.

That members of the academy be requested to contribute their own papers to the *Proceedings*.

That the policy of requiring each recipient of a grant for any research from any of the special funds to publish an account of the results of the researches under the grant in the *Proceedings* be approved.

That the academy request the committees and trustees of the several trust funds of the academy from which grants are made that whenever accounts of researches under grants are published in the *Proceedings* there shall be paid over from the trust fund out of which the grants are made, to the *Proceedings* account, if such action is permissible under the terms of the bequest, a sum of money to cover the expense of the publication.

A report was received from the finance committee of the *Proceedings*, signed by C. B. Davenport, chairman, F. R. Lillie and Raymond Pearl, as follows:

The estimated net cost of the *Proceedings* for 1918 is $5,600.

The estimated income is as follows:

From subscriptions (provided each member of the academy becomes responsible for one subscription)	$1,800
One third guarantee fund of $2,500	833
Estimated income of Billings Fund	187
Sundry other income (members dues, $850; N.R.C., $400; Dr. Walcott, special, $100)	1,350
Total estimated income	$4,170
Total estimated deficit	$1,430

If recommendation of the editorial board that space for reports of special grants in *Proceedings* be specially paid for be adopted, this deficit will be reduced to $1,200.

The committee plans to raise funds to meet this deficit.

SQUAW ISLAND, NEW YORK STATE MUSEUM RESERVATION

THE New York State Museum, which has already taken over, with the aid of appreciative citizens, several interesting properties in the state of New York for the purpose of recording and conserving their geological attractions, has recently come into possession of Squaw Island in Canandaigua Lake. The spot is of special geological interest from the fact that the island is made up of deposits of algal lime concretions or "water-biscuit" formed by the precipitation of lime carbonate through the activity of growing algæ which coat the shale pebbles of the beaches. A brook flowing in from the north over the limestone region brings waters that are well saturated with lime carbonate, and these waters washing against the barrier of Squaw Island have the excess of carbon dioxide stolen away by the growing algae so that the lime carbonate precipitates immediately upon the beach material and in this way the so-called water-biscuits are built up contemporaneously with the growth of the algæ. These algal lime balls, on solution in acid, leave behind a matted felt of algal threads of the same size as the hardened ball showing contemporaneous growth and activity throughout the period of deposition. Squaw Island has become well known to students of paleontology for the light these water-biscuits have thrown upon the formation of the great algal reefs such as the Cambrian Cryptozoon ledges of New York and the Pre-cambrian Algal ledges which have recently been described by Walcott from the Rocky Mountains.

SCIENTIFIC NOTES AND NEWS

Professor Wilder D. Bancroft, of the department of chemistry of Cornell University, who has been engaged in government work since our entry into the war, has been commissioned a lieutenant colonel in the Chemical Warfare Service.

There has been organized at Dijon a scientific society or *cercle* for the purpose of amalgamating Franco-American interests in this special territory. The presidents are Major W. B. Cannon, of the United States Army, and Professor Bataillon, dean of the faculty of science. Among those present at the first meeting were American military medical officers, the médecin chef de la Place, the members of the Corps de santé français, the professors of the faculty of science and of the Ecole de médecine et de pharmacie de Dijon.

Mr. Henry Griscom Parsons, supervisor of gardening instruction at the New York Botanical Garden, has been commissioned with the rank of captain in the Quartermaster's Department of the Army, and has been assigned to the Conservation and Reclamation Division, salvage and gardening branch, being put in charge of the farming and gardening operations at the various cantonments, with headquarters at Washington.

Dr. Simon Flexner, of the Rockefeller Institute for Medical Research, has been elected a foreign member of the Swedish Medical Society at Stockholm.

Dr. W. J. Spillman has resigned as chief of the Office of Farm Management in the United States Department of Agriculture to accept the editorship of *The Farm Journal* at Philadelphia. For the present he will continue to reside in Washington.

Dr. Harry S. Bernton, pathologist to the Pennsylvania State Board of Health, has resigned to become the chief of the bureau of preventable diseases and director of the biologic laboratories of the Health Department of the District of Columbia.

A party of agricultural experts of the bureau of plant industry of the United States Department of Agriculture have been sent to Algeria, Tunis and Morocco to investigate and advise on the possibilities of increasing the agricultural output of those French colonies. The visit is to be made at the request of the French High Commission now in the United States. The party is composed of E. C. Chilcott, in charge of the dry farming investigations of the bureau; C. S. Scofield, in charge of the bureau's work in development of irrigation agriculture, and T. H. Kearney, in charge of important work with alkali and drought-resistant crops.

Dr. W. A. Cannon, of the department of botanical research of the Carnegie Institution, expects to be in Australia for about twelve months, where he will make field studies of desert plants with special reference to root habits.

Henry Hinds has returned to Washington from Panama and Costa Rico, where he was acting chief geologist for the Sinclair Central American Oil Company. He is now serving as geologist for the U. S. Geological Survey and the Fuel Administration, in charge of the work of furnishing geological advice for the use of the Capital Issues Committee in considering the applications of oil and gas companies to issue stocks and bonds for development purposes.

Dr. Karl T. Compton, formerly of the department of physics of Reed College, is now in Paris as a technical assistant with the Research Information Committee authorized by joint action of the Secretaries of War and Navy.

Professor Hudson B. Hastings, of Reed College, has been engaged by the Food Administration as economic and statistical expert in the study of problems arising in connection with the salmon and milk industries.

Dr. S. I. Kornhauser, associate professor of zoology at Northwestern University, has entered the Sanitary Corps of the army as a lieutenant and will report at the Brady Laboratory, New Haven.

Assistant Professor Asa C. Chandler, Ph.D., of the department of zoology and physiology in the Oregon Agricultural College,

has been appointed second lieutenant in the sanitary corps of the army and is on detail service at the Rockefeller Institute, New York City.

THE death is announced of Dr. R. G. Hebb, consulting physician and pathologist to the Westminster Hospital, secretary to the Royal Microscopical Society from 1898 to 1911, editor of the *Journal of the Royal Microscopical Society*, from 1902 to the time of his death.

A NUMBER of news photographers are urgently needed by the Signal Corps. These men must have expert experience in handling of speed cameras, such as Graflex and Graphic, and also understand speeds of lenses and various makes of cameras and their operation. Only those men who can furnish references as to their actual experience as news photographers will receive consideration. The men selected for this branch of the service will be sent to a school for military training. Upon completion of the training they will be promoted to grades of sergeant, first class, and will be ordered overseas in a short time. Applicants must be citizens of the United States between the ages of twenty-one and thirty-one.

THE U. S. Civil Service Commission announces an examination for scenario editor, for both men and women, on September 18, 1918. A vacancy in the Department of Agriculture, Washington, D. C., at $1,600 a year, will be filled from this examination. The duties of the appointee will consist of preparation and editing of educational motion-picture scenarios dealing with agriculture, home economics and other subjects covered by the work of the Department of Agriculture, the writing of subtitles and descriptions of motion pictures on such subjects, and the preparation and editing of other similarly written educational material.

THE *British Medical Journal* states that during the summer school, Cambridge, Sir William Osler, on August 7, gave a sketch of the evolution of scientific medicine in the United States, illustrated by lantern slides. He divided the story into four periods. The first, British, to 1820, concerned with medicine among the early colonists, tracing the influence of Edinburgh and of John Hunter, and coming down to the New England group illustrated by Jacob Bigelow and James Jackson. The second, French, period extended from 1820 to 1860, when the influence of Laënnec and Louis was supreme; of the third, German, period extended from 1860 to 1890, the main features were specialism at the Vienna school, the teaching of Virchow and Koch, and the work of Traube in experimental medicine. The fourth period is the American, from 1890 to the present day, its chief features being the reorganization of hospitals as integral parts of the university system, and unit and team work illustrated in the clinics of Cushing, Halsted and the Mayo brothers.

A MEDICAL division has been established in the Provost Marshal-General's Office. The first step was the appointment last February of Dr., now Colonel, Frank Billings, who was assigned as medical aide to the Provost Marshal-General. But since that time the medical phases have developed to such an extent that the enlargement of this position into a specific division in the Provost Marshal-General's Office has followed. The personnel of the medical division consists of Colonel F. R. Keefer, of the regular medical corps, chief, assisted by Major Hubert Work and Captain D. Chester Brown.

THE British Board of Agriculture and Fisheries has appointed a committee to study the life habits of the honey bee with the object of improving the conditions under which bee-keeping is carried on in England and Wales, and to investigate the epidemic diseases of the bee, more especially the disease or group of diseases which pass under the name of "Isle of White" disease. The committee consists of: The Master of Christ's College, Cambridge (Dr. A. E. Shipley, F.R.S.); Professor Punnett, F.R.S. (professor of genetics, Cambridge); Dr. G. S. Graham Smith, M.D.; Professor G. C. Bourne, F.R.S.. D.Sc. (professor of zoology and comparative anatomy, Oxford); Professor W. Somerville (professor of rural economy, Oxford); Mr. T. W. Cowan (chairman of the British Bee-keepers Association);

Mr. G. W. Bullamore; Mr. J. C. Bee Mason; and Mr. A. G. L. Rogers (head of the Horticulture Branch, Board of Agriculture and Fisheries). Mr. R. H. Adie will act as secretary. It is proposed to undertake the study of healthy bees at Cambridge and the investigations on Isle of Wight disease at Oxford. The committee would be glad to receive specimens of bees suspected of suffering from "Isle of Wight" disease for examination and experiment.

The American Public Health Association will meet at Chicago from October 14 to 17. Some of the military sanitarians who will address the meetings are Surgeon-General Gorgas, Colonel Victor C. Vaughan, and Major William H. Welch of the Army Medical Corps. Other speakers at the general sessions will be George H. Vincent, president of the Rockefeller Foundation; Dr. Charles J. Hastings, president of the American Public Health Association; D. W. A. Evans, Assistant Surgeon-General Allan J. McLaughlin, U.S.P.H.S., Dr. Ernest S. Bishop, Dr. Lee K. Frankel, Dr. Frederick L. Hoffman and others.

One motion-picture film is now being supplied every two weeks by the United States Department of Agriculture for release in the *Universal Screen Magazine*. These films show in an interesting and educational manner some of the activities of the department and of the important lessons which the department is trying to teach. Films that have already been released show work of the pig clubs, road building, forest-fire prevention, poultry management, cattle and sheep grazing on the national forests, types of horses, cooperative berry growing in the Pacific Northwest, the government's method of tree planting on the national forests, how the department regulates logging in the national forests, and the work of the forest ranger.

The War Department authorizes the statement that as a result of the studies at the front, methods have been developed whereby more than 80 per cent. of the wounded, who originally remained at the military hospitals for months, are now cured and returned to the forces in three or four weeks. In order that Army surgeons stationed at camps, cantonments and other military hospitals in this country may thoroughly understand the latest treatment of war wounds, the Army Medical Department has had established special classes of instruction to which are sent selected officers who, upon completion of their courses, return to their own hospitals and instruct other surgeons in these methods. The earliest possible information of changes of treatment are sent to the Surgeon-General's Office from the American Expeditionary Forces, and these in turn are immediately transmitted through the classes and, by means of moving pictures, lantern slides and pamphlets, to every surgeon who will come in contact with these wounds either at home or at the front. Since last October more than 150 officers have received special instruction each month in classes which have been established at the War Demonstration Hospital, Rockefeller Institute; four classes at Bellevue Hospital, New York, Roosevelt Hospital, New York, University of Pennsylvania, at Philadelphia, Rochester, Minn., Pittsburgh, Chicago, New Orleans and San Francisco. All surgeons who will come into contact with war wounds have received instruction in the methods of administering the Carrel-Dakin treatment, and sufficient apparatus has been furnished to treat every patient in the service who may require this method. A large supply of apparatus has been sent to Europe so that there are now more than 50 sets available for every injured man who, up to the present time, has needed this treatment, and over 3,000 sets are being shipped every month to care for the added number of wounded in which this application may be necessary.

At a meeting of the board of directors of the American Institute of Mining Engineers, recently held in New York, it was decided to drop all enemy aliens from membership. The meeting, which was under the chairmanship of Sidney J. Jennings, president of the institute, was attended by twenty-three of the

twenty-five directors, among them the chairman and four members of the naval consulting board. The action of the board of directors is said to affect the status of twenty-one German men of science and one Austrian professor who held either honorary or active membership in the association. The institute now has a membership of about 6,600 in this country and there are more than 1,000 members abroad.

DR. GEORGE D. HUBBARD, head of the department of geology at Oberlin College, spent the summer in Wyoming doing research work for the federal government. Dr. Hubbard's special problem was the location of war materials, particularly petroleum. His course in the Oberlin Summer School in the principles of geography was given by Mr. E. T. Thomas, supervisor of geography in the Shaker Heights Schools, Cleveland, Ohio.

UNIVERSITY AND EDUCATIONAL NEWS

REED COLLEGE is awaiting the decision of the War Department and the Federal Board for Vocational Education in regard to the college's offer to undertake extensive service in the reeducation of the wounded for industrial activity. An offer of $200,000 in equipment for a school of this nature and another offer of grounds and buildings suitable for a convalescent hospital and remedial workshops have been made to the college.

PLANS have been prepared for a laboratory building for the Yale Medical School, New Haven. The building is to be of brick and steel construction.

THE West Riding Education Committee has renewed for another year its grant of £500 to the Department of Glass Technology at Sheffield University.

As a memorial to their son, William Frederick Drughorn, an old King's scholar, killed in action, Mr. and Mrs. Drughorn have endowed King's School, Canterbury, with laboratories, to be known as the Drughorn Science Buildings, at a cost of £25,000.

PROFESSOR ELIAS J. DURAND, of the University of Missouri, has been appointed to a professorship of botany in the University of Minnesota.

DR. ALBERT EDWARD HENNINGS, of the University of Saskatchewan, Canada, has been appointed to an assistant professorship in the department of physics of the University of Chicago. The following promotions have also been announced: Associate Professor Albert Johannsen, of the department of geology, to a professorship; Assistant Professors Albert D. Brokaw and Rollin T. Chamberlin, of the same department, to associate professorships; and Dr. Eugene A. Stephenson, of the same department, to an assistant professorship.

DR. HARRY SHIPLEY FRY, former associate professor of chemistry, has been appointed professor and head of the department of chemistry at the University of Cincinnati. Other appointments in this department are as follows: Dr. Earl F. Farnau, associate professor of organic chemistry, formerly assistant professor of chemistry at New York University; Dr. Ralph E. Oesper, associate professor of analytical chemistry, formerly assistant professor of chemistry at Smith College; Dr. Clifford J. Rolle and Dr. Leonora Neuffer, instructors in chemistry.

CHARLES L. RAIFORD, Ph.D. (Chicago), head of the department of chemistry at Stillwater, Oklahoma, has been elected associate professor of chemistry at the University of Iowa. He will take charge of some of the classes of Professor Hixson, who is now consulting chemical engineer in the ordnance department of the U. S. Army.

ERIC THERKELSEN, who for several years has been a member of the engineering faculty of the University of Washington, has accepted an assistant professorship of mechanical engineering at the Montana State College.

DISCUSSION AND CORRESPONDENCE

BARLEY BREAD, OPTIMUM REACTION AND SALT EFFECT

WHEN the attempt is made to make barley bread with a wheat flour content lower than

70 per cent., the result is a heavy, sour bread. The difference in chemical composition between barley gluten is scarcely sufficient to account for the difference in behavior of the two flours to yeast (Plimmer):

	Wheat	Barley
Total protein	10.00	11.00
Gliadin	4.25	4.00
Glutenin	4.00	4.5

Accordingly, it seemed that physical chemical factors might enter into the question. With some colloids at least, the viscosity is increased by raising the content of inorganic salt (Loeb) and this is apparently what is desired in the case of barley gluten.[1] At the same time, it seemed desirable to determine the optimum hydrogen ion concentration of some of the flours in the presence of yeast. Accordingly, the following experiments were performed:

Wheat, barley, rice and potato flours were used. When prepared without wheat, rice and potato flours failed to rise, owing to the lack of a protein similar to gluten, whose physical characters permitted the holding of the gases, CO_2 especially, to "lighten" the dough. When used with distilled water, barley flour alone gave practically the same sort of bread as that when wheat flour is used in amounts smaller than 70 per cent., the heaviness and sourness rendering its use impossible. An attempt was made to mix barley and rice, barley and potato, etc., but the results were even worse than with barley alone.

The influence of various degrees of alkalinity and of acidity were then examined. By the aid of the chart of Sørensen, mixtures of KH_2PO_4 and Na_2HPO_4 were made. Twenty-five grams of barley flour were weighed into an evaporating dish and 35 c.c. of one of the various solutions were added, together with one gram of Fleishman's compressed yeast. The whole was then intimately mixed, transferred to a cylinder and left to rise at 35° C. for one half hour, in the constant temperature room. Solutions of phosphates were used as follows: Ph = 8.0, 7.6, 7.4, 7.0, 6.4, 6.0, 5.2, 4.6. The optimum rise was obtained at 5.2 and later it was determined that with solutions at Ph = 5.0, the best results were obtained. Controls were conducted with wheat flour, using distilled water.

In passing it may be remarked that similar experiments with wheat flour have the optimum at a lower acidity than that given here for barley flour.

It has been supposed that there is a specific chemical effect in the phosphates, owing to the difference in phosphate composition in wheat and other gluten-bearing flours. Inasmuch as we are able to use lactic and acetic acids at Ph = 5.0, it seems that the effect is rather one concerned with reaction.

After the dough had risen, the preparation was removed and mixed with ten grams of fresh barley flour, the whole kneaded well and transferred to a pyrex beaker which was placed in an electric baking oven for one hour at 220° C. Besides barley flour, we also used rice and potato flours, separately, but without improving the resulting bread.

The bread thus made is fairly good and greatly superior to that made from water preparations.

We repeated the experiment just described with barley, this time using 2 per cent. NaCl (introduced dry) in the dough. A much lighter loaf was obtained, the initial rise being greater and the subsequent dough on the second rising being more similar to that of wheat preparations. A good crust is formed and there is less sourness, characteristic of all barley breads.

It is apparent, then, that by maintaining a reaction approximating Ph = 5 and a sodium chlorid content (added) of 2 per cent., barley flour may be utilized by itself to make a passing war bread. By suitable manipulation, we have little doubt that an experienced baker can derive a formula whereby an excellent bread can be produced at will.

Lorraine L. Landenberger,
Withrow Morse

Michael Reese Hospital,
Chicago

[1] *Cf.* Upson's work.

CONCERTED BEHAVIOR OF TERRESTRIAL MOLLUSKS

ON August 29, 1915, the writer collected 125 specimens of *Cochlicopa lubrica* (lot 146*a*) from the outer surface of the door and frame of the "dark room" at the Iowa Lakeside Laboratory, on Lake Okoboji. This small frame building is more than half imbedded in the hillside about 15 feet above the level of the lake. The roof is covered with humus dirt and vegetation. A short passageway walled with heavy boards leads to the doorway.

Throughout the preceding night there had been a constant, cold rain. On the morning of the 29th there was a cold, drying wind. On the afternoon of this day I chanced to notice a specimen of *Cochlicopa* on the door-frame; closer examination then revealed a good many, and I spent an hour or more in gathering them. Those attached to the walls were at all heights, with the apex directly downwards, which latter fact, I presume, indicates that their movement had been upwards. None of the specimens were moving at the time, but all were retracted and fastened by a secretion to the substrate. Doubtless this condition is explained by the fact that the wind had made the planks so dry that locomotion was difficult or impossible. Ten or fifteen specimens were picked up from the ground close to the wall, but were inactive and lay as they had fallen. A few, also, were found in cobwebs, by which they had been caught as they fell from the vertical walls. While a few specimens were found on the south wall, most were on the north wall (which faced the south) and the northeast corner of the building (which faced east to north). Besides the *Cochlicopæ*, a considerable number of specimens of *Vallonia gracilicosta* were found; and also about fifteen specimens of *Bifidaria armifera*. However, the two latter species did not exhibit any uniformity in orientation, so far as noticed, at least.

Concerning the *Cochlicopæ*, the writer was puzzled to account, not only for their presence in rather large numbers, but for the singular uniformity of their behavior. The snails on the vertical walls were at all heights from the ground, and all exhibited precisely the same orientation, viz., the apex of the shell pointed downward. They evidently had come from the ground below. But why should they be moving upward? Under conditions of drouth and cold one would expect these forms to exhibit a positively geotropic response. Close to the water's edge among the rocks and fallen leaves the writer had been accustomed to find this species rather common; but never so many in a given area as occurred on this occasion. None had ever been found on this slope so far up, before.

It seemed to the writer that so many of these snails being found together, and with similar orientation, was a fact inviting explanation, which, however, he is unable to furnish. This case differs from the synchronic behavior recently described in SCIENCE by several authors, in that it lacks the element of rhythm. In the movement of the group of harvestmen, as described by Newman, and the simultaneous movement of the fall web-worn, described by Peairs, there is a rhythmic group movement which may be distinguished from concert of action. And while I am unable to explain the behavior of these snails, I am inclined to look upon it as a sort of concerted action.

T. C. STEPHENS

MORNINGSIDE COLLEGE,
SIOUX CITY, IA.

A COUNTRY WITHOUT A NAME

TO THE EDITOR OF SCIENCE: I am glad to see that some one has at last had the insight and courage to note and call attention to the fact that our nation has no name. "The United States" is no name at all, and merely because we call the United States of Mexico "Mexico," and the United States of Brazil "Brazil," is no justification for calling the United States of America "America." Our brothers to our north call us "the States," which is about as meaningless as anything can be, but it is our own fault that we are so called. Some years ago there was a popular musical comedy containing a song entitled "My own United States," but it could arouse no thrill with such a handicap. Indeed we do need a national name more than a national flower,

though I do not know what we can do now to correct our faulty condition, one hundred and forty years after the birth of our nameless nation. Would that our fathers had seized upon our beautiful nickname, "Columbia," for our own official designation, before our pugnacious southern neighbor Columbia had stolen it for herself!

J. S. Moore
Western Reserve University,
Cleveland, Ohio

To the Editor of Science: The name "America" inspires millions of individuals and the logical necessity for a name which is more specific, as pointed out by one of your correspondents in Science of July 5, will gain little acknowledgment and no popularity. Nevertheless the necessity remains and should be dealt with. The custom and sentiment of the masses is the deciding factor and any change can come only by a gradual transformation. If the term America, like Europe, Africa and Asia applies to a continent, as it does, then American implies Canadian, Brazilian and Patagonian just as well. We have in our case the modifying factor of "United States," which, as the correspondent puts it: "is lacking an adjective." To supply this adjective another name is needed. Why not hit two marks in one stroke by printing upon our postage stamps: USoNA? Perhaps this name might gain popularity and would permit an adjective "Usonian." At the same time the most numerous representatives of the nation would sail under a more specific label: U. S. o. N. A. instead of U. S. POSTAGE. Incidentally I wonder how long the inaccurate use of U. S. A. will survive. It has often been pointed out that U. S. A. is the official abbreviation for "United States Army" and U. S. N. for the navy, while U. S. means the United States and U. S. N. A. the United States of North America. Perhaps an experiment with postage stamps, as suggested above, may educate the people to use Usona, or the correct U. S.

Ingo W. D. Hackh
Berkeley, Calif.

SCIENTIFIC BOOKS

City Milk Supply. By Horatio Newton Parker. New York, McGraw-Hill Book Company, Inc. Pp. 486.

The author's purpose is plainly set forth in the brief preface, namely to give much-needed information on the broad subject of milk production, transportation and control of purity. This purpose he has admirably accomplished. The book seems complete in itself. The subject matter is divided into seven chapters, as follows: I. Milk; II., Diseases Communicable in Milk; III., Dairy Cattle and the Dairy Farm; IV., Sanitary Milk Production; V., Transportation of Milk; VI., The Milk Contractor, and VII., Control of the Public Milk Supply.

Printed in somewhat compact form, in good bold type and on good paper, the different topics are presented clearly, and in many parts with the first-hand information and understanding of the various difficult problems which only one who has spent many years of study in this field is able to give.

In the chapter on diseases communicable in milk the treatment of tuberculosis is particularly instructive. The tuberculin test, and the present-day controversy regarding its value and enforced application are discussed at some length and without bias. Septic sore throat likewise comes in for a good share of the writer's attention.

A comprehensive history of the score card system of rating dairies, and a full discussion of its merits and of its serious limitations will be found to be interesting and illuminating. The importance which the author attaches to the bacteriological examination of milk is most gratifying to those who have long lent their support to its complete adoption as a method of controlling sanitary milk production. A good account is given also of the origin and pernicious influence of the so-called "slop dairy," and of the long struggle that has been waged for improved feeding and housing conditions in the dairy barn.

The author has been particularly successful in his treatment of the material in the chapter on the milk contractor. The peculiar

relations of the contractor to both the producer and consumer are well portrayed, and the many and almost insurmountable problems of bringing milk to the doors of the consumers in as pure a state, and as quickly as possible, without prohibitive cost, are clearly presented and discussed from every possible angle. The pages in the last chapter on municipal and state control of milk production and distribution, with types of ordinances as examples, should be of much interest to health officers and milk inspectors. The practical application of scientific principles to milk production, and the different bacteriological and chemical methods and standards for controlling the purity of milk, receive their due share of attention. The book concludes with a discussion of infant mortality.

It is unfortunate that grammatical errors should have been allowed to creep into the book here and there, as for example the following: "Enough data *has* been collected" (page 180), and "the relations between the farmer and city milkman *is* delicate"; and in the use of scientific names, as for instance in "streptococci, staphylococci and *bacteria* were found." A very common error in punctuation is the absence of the comma between the principal parts of a compound sentence, especially where the conjunctive "but" is used. These are, however, but minor defects which will undoubtedly be eliminated from future editions.

The author does not claim originality, but as he states, has drawn from a wide field of experience of others, experts in their own domain, who have been given full credit, and to whose work references are given at the end of the individual chapters. Throughout the book original tables and illustrations materially add to its value.

LEO F. RETTGER
SHEFFIELD SCIENTIFIC SCHOOL,
YALE UNIVERSITY

SPECIAL ARTICLES

CORPUS LUTEUM AND THE PERIODICITY IN THE SEXUAL CYCLE

IN a recent paper G. W. Corner and F. H. Hurni report on experiments in which they injected intraperitoneally rats with suspensions of corpus luteum preparations.[1] In all but one animal the substance prepared by Armour & Company was used.

While Corner and Hurni find that such injections may cause peritoneal adhesions and peritonitis, they failed to inhibit ovulation. So far the experiments of these authors are essentially in agreement with the results not mentioned by Corner and Hurni which I previously obtained in guinea-pigs.[2] I stated:

> While in some injected guinea-pigs ovulation was apparently delayed, in others it took place at the expected term despite the fact that these animals had repeatedly received large doses of lutein. We may therefore conclude that injections of lutein extract can not wholly take the place of the living corpus luteum. Whether or not they can do so partially in mammals, I am not prepared to say on the evidence at hand.

Some details as to doses used in these experiments are found in a paper in which in conjunction with Dr. Cora Hesselberg I reported on the effect of such injections on the cycle of the mammary gland in the guinea-pig.[3]

Our experiments on the effect of injections of corpus luteum substance had been suggested through positive results which R. Pearl and Surface had previously published concerning the retarding effect of such injections on the ovulation in birds.[4]

We emphasized the negative character of our results, because a slight delay in ovulation can be induced in the guinea-pig through various experimental interferences, and especially did we find that undernourishment prevented the normal maturation of follicles.[5]

The experiments in which ovulation oc-

[1] George W. Corner and Felix H. Hurni, *American Journal of Physiology*, 1918, XLVI., 483.

[2] Leo Loeb, "Surgery, Gynecology and Obstetrics," 1917, XXV., 300.

[3] Leo Loeb and Cora Hesselberg, *Journal Exper. Medicine*, 1917, XXV., p. 305.

[4] Raymond Pearl and F. M. Surface, *Journal Biol. Chem.*, 1914, XIX., p. 263.

[5] Leo Loeb, *Biological Bulletin*, 1917, XXXII., p. 91.

curred at the normal term, notwithstanding the injections, seemed to us therefore of greater significance. Corner and Hurni, however, go further in their conclusions and state: "Thus it would seem that Loeb's experiments do not prove an acceleration of ovulation following the removal of the corpora lutea."

This conclusion rests (1) on the lack of effect of the injection of dried corpus luteum substance in inhibiting ovulation. (2) On the alleged proof given by Stockard and Papanicolaou that I assumed the normal sexual cycle in the guinea-pig to be longer than they found it to be by a method which they believed to be superior to the one which I used.

Inasmuch as, to my knowledge, my investigations provide the essential experimental basis for the conclusion that the corpus luteum has the stated function, and that the denial of the correctness of my conclusion would invalidate the significance of the corpus luteum as an important factor in the mechanism regulating the sexual cycle, I believe it advisable to inquire whether or not the statement made by Corner and Hurni is warranted by facts.

Without going into a detailed restatement of the results which I have published in a series of preceding papers, I may give a brief summary of some of the essential results obtained. In a first series of investigations I determined the duration of the sexual cycle in guinea-pigs in which in most cases the uterus had been subjected to certain experimental interferences in the early period of the sexual cycle.[6] It was found that while in these cases the second ovulation may occur as early as 16–18 days after the first ovulation, it occurred quite commonly somewhere between the twentieth and thirtieth day after ovulation; this was found to be so, especially in cases in which through incisions made into the uterus deciduomata had been produced experimentally. In a series of guinea-pigs in which the uterus had been treated in a way similar to the control series, but in which, in addition, at an early stage of the sexual cycle the corpora lutea had been completely extirpated with a knife, ovulation occurred in the large majority of cases between the twelfth and sixteenth day after the first ovulation. A period of approximately 9 to 13 days following an ovulation is required for the new formation of mature follicles in the guinea-pig, each ovulation in the guinea-pig being accompanied by an atresia of all but the smallest follicles.[7] While this series, as such, proved the significance of the corpus luteum for the duration of the sexual cycle, the correctness of our interpretation was made certain by our further finding that while in the normal course of pregnancy ovulation does not occur in the guinea-pig, after a preceding extirpation of the corpora lutea about 6–7 days following copulation the pregnancy may proceed, but an early ovulation occurs, notwithstanding the presence of pregnancy just as it does after extirpation of the corpora lutea in the cycle unaccompanied by pregnancy. In this case the difference in the time of ovulation is so great as the result of the extirpation of the corpora lutea that an error of interpretation can be excluded with certainty.

Extirpation of the corpora lutea did not exert this effect on the sexual cycle in a purely mechanical way; excision of control pieces of ovarian tissue did not have the typical effect; neither did such cases respond in which the extirpation of the corpora lutea was incomplete. Complete extirpation of corpora lutea on the other hand exerted its effect on both ovaries, even in cases in which one of the two ovaries had been free from corpora lutea at the time of extirpation. It was probable that this inhibiting effect of the corpus luteum was due to the secretion of a substance on the part of the corpus luteum.

In further experiments I showed that the presence of the corpus luteum did not inhibit the maturation of follicles, but merely the rupture of mature follicles.

In my first publication I called attention to the possibility that the experimental interfer-

[6] Leo Loeb, *Deutsch. mediz. Wochen.*, 1911, No. 1. *Zentralblatt f. Physiol.*, 1910, XXIV., No. 6; 1911, XXV., No. 9.

[7] Leo Loeb, *Journal of Morphology*, 1911, XXII., p. 37. *Virchow's Archiv*, 1911, CCVI., 278.

ence with the uterus which was practised in these cases might somewhat modify the duration of the sexual cycle, but that if such a modification did exist, it applied equally to experiments in which the corpora lutea had been extirpated and to control cases. Therefore our conclusions concerning the inhibiting function of the corpus luteum was not affected by such an interference. However, we had intended to continue our investigation in this direction and in later determinations we found, in guinea-pigs in which the uterus had not previously been interferred with, the length of the sexual period to vary between 15 and 18 or 19 days.[8] In two cases we observed the new ovulation as early as 13½ to 14½ days after the preceding ovulation. A certain latitude exists therefore in the periodicity of the normal sexual cycle.

Again we could confirm our previous results: Excision of the corpora lutea carried out within the first week after copulation brings about a new ovulation between the tenth and fifteenth day after copulation in the majority of such cases, and we were able to observe it as early as 8½ and 9 days after copulation.

As in our previous experiments pregnancy did not prevent the early ovulation after a complete extirpation of the corpora lutea. It is only the persistence of the corpora lutea of pregnancy which prevents ovulation.

While in our previous investigations we had studied mainly the cyclic changes in the ovaries and only incidentally referred to cyclic changes, in the uterus, in the last-named paper we extended our studies to the cyclic changes in the uterus and to the correlation of the cyclic changes in the uterus and ovaries. In our determination of the sexual cycle we made use of the following criteria:

1. Whenever feasible the period of heat was observed; the behavior of the animal as well as the condition of vulva and vagina serving as indicators, which in the hands of an experienced breeder gave reliable results as the subsequent macroscopic and microscopic examination of uterus and ovaries proved in each case. In other animals the observed copulation indicated the approximate time of ovulation. We followed the cyclic changes in uterus and ovaries from day to day and could thus establish a definite and orderly sequence of events. By correlating the condition of the corpora lutea, follicles and uterine mucosa, it was possible to determine the stage of the sexual cycle of the observed guinea-pigs with a precision which was entirely adequate for our purposes. Thus to mention only one instance it was possible by microscopic examination of the uterus alone without examination of the ovaries to determine whether in an animal at an early stage of the sexual cycle ovulation had or had not taken place.

Subsequent to our last mentioned investigations, Stockard and Papanicolaou[9] published a study of the sexual cycle in the uterus of the guinea-pig, in which they used the naked eye observations of vaginal changes as a criterion of the stage of the sexual cycle. These investigators confirmed in all essential points our previous results, though they do not mention our principal paper in which we gave a detailed description of the uterine cyclic changes in the guinea-pig. This omission, Dr. Stockard informed me later, was due to his failure to read my paper.

The difference in the duration of the sexual cycle in our first and second series of experiments led to a further elucidation of the factors on which the mechanism of the sexual cycle depends. We found that the presence of experimentally produced deciduomata without accompanying pregnancy prolongs the duration of the sexual cycle, but only in cases in which the corpora lutea are present. After extirpation of the corpora lutea an accelerated ovulation takes place notwithstanding the presence of living deciduomata; the deciduomata act, therefore, in a way similar to pregnancy. We found furthermore that after degeneration of the deciduomata ovulation occurs. We may therefore conclude that living deciduomata probably prolong the life of the corpora lutea and that this effect leads to a

[8] Leo Loeb, *Biological Bulletin*, 1914, XXVII., p. 1.

[9] Charles R. Stockard and G. N. Papanicolaou, *Am. Jour. Anatomy*, 1917, XXII., p. 225.

prolongation of the sexual cycle. It may be that also in pregnancy the decidua may contribute directly to the prolonged life of the corpora lutea and thus indirectly be responsible for the lack of ovulation during the period of gestation. We found further that during pregnancy the life of experimental deciduomata is prolonged very considerably, and we may provisionally assume that directly or indirectly the presence of an embryo is responsible for the preservation of deciduomata during pregnancy. It accords with these observations that in a case of experimentally produced extrauterine pregnancy in which a living embryo, but no decidua was present, we did not find the life of the corpus luteum prolonged, and consequently an ovulation had taken place despite the presence of a living embryo.[10] In a provisional way we may therefore assume that the life of the corpus luteum, which is one of the determiners of the duration of the sexual cycle, depends among other factors upon the life of the deciduomata or decidua and that the latter depends upon the existence of a living embryo. We have carried out a series of experiments concerning this question several years ago, but stress of other work has so far prevented a detailed study of our results. However, we referred to them in a preliminary way in a recent communication dealing with those problems.

We have now to consider briefly the reason why it is that while we can consider as firmly established the significance of the corpus luteum for the sexual cycle, injections of dried corpus luteum substance are without a decided effect on ovulation, and likewise without effect on the growth of the mammary gland in the guinea-pig, as we established more recently. We can not answer this question definitely at the present time, but we can at least consider certain possibilities and refer to some interesting analogies. It might be that the isolated lipoid extract of the corpus luteum would have been active where we established the lack of efficiency in dried gland from which, as was the case in Armour's preparation, the lipoids had been previously removed. This would be in accordance with the observation made by several investigators who found that injection of lipoid extracts of corpus luteum or placenta causes growth processes in the uterus and mammary gland. However, these induced growth processes are evidently not identical with the cyclic changes normally taking place in these organs. Or it might be that the process of drying destroyed the active principle. Thus we know that while suspension of living cells when injected produce immunity against tumor growth in the mouse, cells which have been previously treated in a way similar to the treatment accorded to the corpus luteum and thus killed, have completely lost their efficiency. We know furthermore, that the antigens against mouse tumors are species specific; on the whole only tissues of the mouse are able to immunize against mouse tumors; tissues of the cow for instance being completely inert. We can not therefore exclude the possibility that extracts prepared from homologous corpora lutea might have been more efficient than those from the cow.

There remains a last possibility which I suggested a number of years ago when I found that a substance given off by the corpus luteum is one of the factors of significance in initiating the decidual reaction and the development of deciduomata in the uterus. At that time I tried to imitate the effect of the corpus luteum on the mucosa of the uterus through implantation of living young corpora lutea obtained from other guinea-pigs in the appropriate stage of the sexual cycle. The implantation of this substance gave either entirely negative results or at least its effects were very weak. I then pointed out that the corpus luteum functions by giving off a small amount of substance continuously during a relatively long period of time, while injection or implantation of corpus luteum substance leads only to the temporary introduction of a larger quantity which is probably rapidly absorbed and eliminated or destroyed, and that it is impossible to imitate in this way the action which takes place in nature.

While we can not be certain at the present

[10] Leo Loeb, *Biological Bulletin*, 1915, XXVIII., p. 59.

time as to which of these explanations will prove to be the correct one, we can at least be certain that the living corpus luteum has the function of inhibiting ovulation and of being a decisive factor in the mechanism of the sexual cycle.

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THE OHIO ACADEMY OF SCIENCE

THE twenty-eighth annual meeting of the Ohio Academy of Science was held at Ohio State University, Columbus, May 30 to June 1, 1918, under the presidency of Professor Francis L. Landacre. Forty-seven members were registered as in attendance; ten new members were elected.

It was reported by the trustees that Mr. Emerson McMillin, of New York City, had again contributed two hundred and fifty dollars to the research fund of the academy.

War conditions were noticeable in a somewhat reduced attendance, as well as in a suggestion of the trustees that a part of the research fund be invested in Liberty Bonds—a suggestion enthusiastically endorsed by the academy.

The following resolution was also adopted, relative to the study of German in the colleges:

The Ohio Academy of Science places itself on record as deprecating the suppression of the study of the German language in the curricula of some of our colleges.

The study of German should be continued not only by reason of its direct utility to our troops abroad, but also because it is fundamentally necessary to science and productive scholarship.

It is not the language, but Prussian ideas, which are antagonistic to the Allied nations; and any action which prevents the efficient development of scholarship and science, and of the industries dependent upon them, will prove advantageous to our enemies.

After adjournment of the formal sessions, the botanists and zoologists made a short auto excursion to the picturesque and ecologically interesting Sugar Grove region, and the geologists took a longer trip for the study of the rock series (Niagara to Carboniferous) and topography between Hillsboro and the Scioto River. Both excursions were eminently successful.

Officers were elected as follows: *President*, M. M. Metcalf, Oberlin College. *Vice-presidents:* Zoology, R. A. Budington, Oberlin College; Botany, C. E. O'Neal, Ohio Wesleyan University; Geology, G. F. Lamb, Mt. Union College; Physics, S. R. Williams, Oberlin College; Medical Sciences, Ernest Scott, Ohio State University. *Secretary*, E. L. Rice, Ohio Wesleyan University. *Treasurer*, J. S. Hine, Ohio State University.

The scientific program was as follows:

PRESIDENTIAL ADDRESS

The origin of the cerebral ganglia of the vertebrates: PROFESSOR F. L. LANDACRE, Ohio State University.

SYMPOSIUM ON SCIENCE AND THE WAR

The work of the ground schools in the training of the air forces of the United States: PROFESSOR F. C. BLAKE, Ohio State University.

Modern methods of plant disease control: PROFESSOR W. G. STOVER, Ohio State University.

Psychological tests in the army: CAPTAIN GEORGE F. ARPS, Ohio State University.

Methods of teaching the theory of flight in schools of aeronautics: PROFESSOR H. C. LORD, Ohio State University.

Topography and the war on the western front: PROFESSOR T. M. HILLS, Ohio State University.

The newer demands on physics and physics teachers due to the war: PROFESSOR E. H. JOHNSON, Kenyon College.

PAPERS

A peculiar habit of the rusty grackle: EDWARD L. RICE.

Notes on distribution of North Atlantic Bryozoa: RAYMOND C. OSBURN.

Economic value of the Ephemerida: CHAS. P. FOX.

Remarks on leaf hoppers of Hawaiian Islands: HERBERT OSBORN.

The fauna of a series of rock-bottomed ponds: F. H. KRECKER.

The habits of the folding-door spiders: W. M. BARROWS.

The subterranean life of meadows and pastures: HERBERT OSBORN.

Opalina and the origin of the Ciliata: MAYNARD M. METCALF.

The bryozoan gizzard: RAYMOND C. OSBURN.

Free-swimming larval colonies of Pectinatella from Black Channel, Cedar Point: STEPHEN R. WILLIAMS.

Anatomy of Echinorhynchus sp.: C. F. MCKHANN, JR., introduced by STEPHEN R. WILLIAMS.

The effect of certain ductless gland extracts on plant tissues: R. A. BUDINGTON.

Our knowledge of Ohio Crustacea: RAYMOND C. OSBURN.

A list of Ohio spiders (now in press): W. M. Barrows.

A preliminary survey of the Protozoa of Mirror Lake on the Ohio State University campus: Mabel E. Stehle.

Application of colloid chemistry to nephritis: Hazel C. Cameron.

Reaction time in the blind and the deaf: A. M. Bleile.

The effect of radium radiations on the germ cells of Drosophila ampelophila: W. M. Barrows.

Studies on vaso-motor balance: Clyde Brooks, Clayton McPeek and R. J. Seymour.

Note on the catalase content of the turtle heart: R. J. Seymour.

Pneumococcus types: Carl L. Spohr.

The cancer problem: Ernest Scott.

Behavior of the X-chromosomes in Branchipus vernalis: R. C. Baker.

Work of the Plant Disease Survey, U. S. D. A., in Ohio: A. D. Selby.

Characteristics of the eruption of Katmai as indictated by its effect on vegetation: Robert F. Griggs.

The Lecideaceæ of Ohio: Bruce Fink.

Interesting ascomycetes: Bruce Fink.

A revised course for secondary botany: Blanche McAvoy.

Inland associations of algæ: E. N. Transeau.

Regeneration studies of Bryophyllum: Charles W. McIntyre.

Effect of hairy coverings on transpiration: Jasper D. Sayre.

Succession of prairies: Homer C. Sampson.

Effect of seed treatment for smut on germination: Wilmer G. Stover.

The indicator significance of plant associations in crop distribution in the United States: Adolph Waller.

Vegetative reproduction of the pinnatifid spleenwort: Clara G. Mark.

An apple root fungous disease: Harry W. Lutz.

An electric drying oven for plant presses: E. Lucy Braun.

Some land forms of central southern Ohio: Lewis G. Westgate.

Fossils of the Greenfield (Ohio) dolomite and where to find them: C. W. Napper.

Moulding sands of Ohio: J. A. Bownocker.

Effects of the Wisconsin glacier on a portion of the Whitewater valley in Indiana: W. M. Tucker.

Some especially interesting new species of Richmond fossils: W. H. Shideler.

Effect of transverse magnetic field on some of the physical properties of nickel wire: A. A. Atkinson.

The magnetic-mechanical analysis of cast iron: Samuel R. Williams.

DEMONSTRATIONS

Specimen of a dermoid cyst with teeth, loaned by Dr. H. Moore, Oxford: Stephen R. Williams.

Leaf hoppers of Hawaiian Islands: Herbert Osborn.

One-eyed frog (Acris gryllus): F. H. Krecker.

Laboratory table tray: F. H. Krecker and W. J. Kostir.

Colony forms in marine Bryozoa: Raymond C. Osburn.

Exhibit of Greenfield (Ohio) Dolomite fossils: C. W. Napper.

Two new varieties of Acer rubrum: Freda Detmers.

A collection of Ohio spiders; a method of exhibiting spiders; nest of folding-door spider: W. M. Barrows.

A vaso-motor balance: Clyde Brooks, Clayton McPeek, R. J. Seymour.

Models of embryonic skull of Eumeces: Edward L. Rice.

Sections of nasal capsule and olfactory nerves of embryonic Cumeces: Edward L. Rice.

X-chromosomes of Branchipus vernalis: R. C. Baker.

Origin of cartilage from ectoderm in the urodeles: F. L. Landacre.

Specimens and photographs from the Valley of Ten Thousand Smokes: Robert F. Griggs.

Edward L. Rice,
Secretary

Delaware, Ohio

SCIENCE

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